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DENATURATION OF HUMAN SERUM ALBUMIN BY CERIUM (III) CHLORIDE

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Cerium (III) Chloride-induced conformational changes of human serum albumin, *HSA*, in phosphate buffer, 10 mM at pH 7.4 was investigated, using isothermal titration calorimetry (ITC), UV and fluorescence emission spectroscopic methods. The results indicate that $CeCl_3$, Ce^{3+}, induces irreversible denaturation of the *HSA* structure. The UV absorption intensity of $HSA + Ce^{3+}$ shows a slight blueshift in the absorbance wavelength with increasing Ce^{3+} concentration. The fluorescence intensity was increased regularly and a slight redshift was observed in the emission wavelength. The $HSA + Ce^{3+}$ complex quenches the fluorescence of *HSA* and changes the microenvironment of tryptophan residue. The emission intensity increases suggesting the loss of the tertiary structure of *HSA*. The results obtained from the ITC data are in agreement with the spectroscopic methods. The strong negative cooperativity of Ce^{3+} binding with *HSA* (Table 1) recovered from the extended solvation model, indicates that *HSA* has been denatured as a result of its interaction with Ce^{3+} ions.

Keywords: Human serum albumin; isothermal titration calorimetry; fluorescence spectroscopy; cerium (III) chloride; UV spectroscopy.

1. Introduction

It is well known that the unfolding of some small proteins presents highly cooperative two-state behavior, while the unfolding of multi domain proteins with populations of partially folded states involves a multi-stage process [1]. The protein

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